PROJECT MANGEMENT PLAN EXAMPLES

Prepare Baselines - Performance Baseline Examples

Example 34

6.0 PROJECT BASELINE

This section presents a summary of the PFP Stabilization and Deactivation Project baseline, which was prepared by an inter-contractor team to support an accelerated planning case for the project. The project schedules and associated cost profiles presented in this section are compared to the currently approved project baseline, as contained in the *Facility Stabilization Project Fiscal Year 1999 Multi-Year Work Plan (MYWP) for WBS 1.4* (FDH 1998). These cost and schedule details will provide the basis for a baseline change request that will be processed to revise the MYWP, consistent with the accelerated project plan presented below.

6.1 Project Baseline Overview

This section of the IPMP presents the PFP baseline cost and schedule summary. The currently approved PFP Stabilization and Deactivation Project baseline, as compared to the revised baseline presented in the IPMP, is summarized below. As can be seen from the following comparison, the key differences between the currently approved baseline and the revised baseline are that the revised baseline accelerates the project schedule and significantly reduces the project total life cycle cost.

Current Baseline (FY99 MYWP)	Revised Project Baseline
Project Scope: ▪ Maintain Safe and Compliant Materials ▪ Maintain Safe and Compliant Facilities ▪ Maintain Safe, Secure Vaults, Safeguards and Security ▪ International Atomic Energy Act Safeguards ▪ Stabilize Plutonium-Bearing Materials ▪ Remove Special Nuclear Material ▪ Transition PFP	Project Scope: ▪ Same as Current Baseline, Except Significant Long-Term S&M of Facilities is Not Required
Schedule: ▪ 39 Years (completion in FY 2038) ▪ DNFSB 94-1 Complete by July 2005 ▪ Initiate SNM Shipments by September 2015 ▪ Remove SNM by September 2027 ▪ Deactivate Facilities by September 2014 and Vaults by September 2028 ▪ Dismantle PFP by September 2038	Schedule: ▪ 17 Years (completion in FY 2016) ▪ DNFSB 94-1 Complete by October 2004 ▪ Initiate SNM Shipments by February ;2000 ▪ Remove SNM by February 2008 ▪ Bring facilities to clean slab-on-grade by January 2016 and Vaults by April 2015 ▪ Complete facility transition Safe & Stable actions by September 2016
Cost: ▪ $2.52 Billion Dollars	Cost: ▪ $1.35 Billion Dollars ($1.17B Savings)

The overall goal of this approach is to **"Dramatically accelerate stabilization and transition and substantially reduce the project life cycle cost."** Based on the above comparison, this goal can be accomplished by the revised project baseline. The resulting benefits are significant, saving about $1 billion dollars and accelerating the project completion date by about 20 years.

This revised baseline takes advantage of several major opportunities, in parallel with the restart of stabilization and packaging after an extended interruption. These major opportunities are as follows:

- Accelerate stabilization activities by implementing technical and programmatic alternatives,
- Accelerate the SNM shipping schedule (start in February 2000 to align with Savannah River Plant processing and storage strategy),
- Challenge and redirect "min. safe" resources to absorb accelerated stabilization and transition activities,
- Accelerate concurrent deactivation and dismantlement to minimize post-transition S&M and life cycle costs.

The project WBS is presented below in Section 6.2. Section 6.3 includes a summary level description of the project implementation approach. Section 6.4 presents the schedule; Section 6.5 presents costs. Section 6.6 includes a description of the project reserve/contingency approach. Section 6.7 discusses strategies for p8ursuing cost and schedule reduction opportunities.

6.2 Work Breakdown Structure

The WBS is developed for the PFP Stabilization and Deactivation Project based on the functional analysis of the project work scope. The revised WBS is depicted in Figure 6-1. The WBS dictionaries are prepared at the WBS function level for inclusion in the Multi-Year Work Plan (MYWP). Lower level WBS dictionaries may be developed at the discretion of the Senior Project Director.

6.3 Project Approach

The overall schedule strategy for the PFP project includes ongoing minimum safe activities, combined with stabilization of materials followed by materials disposition, and subsequent transition of the PFP complex to a decommissioned state.

The PFP material stabilization baseline was developed using a functionally-based work WBS. The WBS defines all activities required to take each material stream from their current location/conditions through stabilization (as required), and disposition the stabilized material as solid waste for shipment to WIPP or as product material for shipment to SRS.

Initially, workshops were held with subject matter experts, project managers, schedulers, and support personnel (experts in the area of radiological control, environmental issues, NEPA documentation, etc.). Requirements for successfully completing stabilization of the material streams for the type of processes to be used were identified. Based on the results of these workshops, flow diagrams, resource and cost estimates, and schedules were developed for the individual processes. A common critical path constraint for many of the material streams was the requirement for a WDOH air permit (Notice of Construction [NOC]). The other administrative critical path requirement was performance of a readiness assessment or operations readiness review for the activity.

The processing activities were prioritized based on risk presented by material streams (for example, metals and solutions pose a higher risk in their current configuration than SS&C). In addition, consideration was given to equipment availability (metals cannot be processed until the bagless transfer system is on line), funding issues, resource constraints, and equipment limitations (solutions, metals, and oxides all require usage of the thermal stabilization furnaces). Finally, operator availability, budgetary limitations, and equipment capacity limited the processing activities themselves. The following sections summarize the implementation approach for each major WBS area.

6.3.1 Maintain Safe and Compliant Condition Approach

As stabilization, disposition, and transition activities are completed, there will be a corresponding reduction in work scope and associated funding levels required to maintain the PFP complex in a safe and compliant condition. There will also be discrete reductions in funding requirements throughout the remaining life of the complex due to reduction in required activities. For example, there is a significant drop in the funding profile after FY 2004. This reduction occurs principally due to the completion of the required revisions to the PFP Criticality Safety Evaluation Reports, a significant reduction in the area of procedure maintenance, and a reduction in new training course development.

At the completion of FY 2005, stabilization activities will be completed in 234-5Z Building. This will result in a corresponding reduction in the Maintain Safe & Compliant Conditions, and in the Maintain Safe & Secure SNM activities. An approximate 50 percent reduction in Safeguards and Security patrol force costs will be achievable. Special nuclear material (SNM) accountability activities will be reduced by approximately 60 percent. Operating, maintenance, and administrative procedures for the stabilization activities are removed in total since they are no longer required. The support for the Facility Safety Analysis Report (FSAR) annual update is reduced by approximately 50 percent, due to the reduction of SNM inventory.

In the last quarter of FY 2007, the final shipment of fuel pins is achieved. This milestone reduces the Safeguards & Security patrol force and SNM accountability requirements by an additional 40 percent. The FSAR annual update is also reduced another estimated 40 percent with the final 10 percent remaining for updates associated with Transition activities. Security system requirements, workscope, and funds are reduced by 100 percent. Surveillance activities and preventative maintenance support associated with 2736-ZB Building drops by an estimated 50 percent.

Over the next several years. the complex will be completing final hold-up processing activities, deactivation facilities in preparation for transition and subsequent demolition, and completion the final shipment of all materials. This results in the reduction of staff, training requirements, facility management, maintenance and operations, surveillances, and quality assurance activities. An assumption was made that this ramp down will occur at a level rate over the period FY 2008 through FY 2014.

During the period FY 2014 through FY 2016, the ventilation systems are removed from various facilities throughout the PFP complex. The remaining facilities are demolished resulting in corresponding reductions in the activities required to maintain the PFP complex in a safe and compliant condition.

In FY 2017, the funding profile to the Maintain Safe & Compliant Conditions activity can be reduced to the minimum necessary to simply provide for basic care of the area where the PFP complex used to stand. This would include activities such as grounds maintenance and minimal surveillance.

6.3.2 Stabilize Materials Approach

6.3.2.1. Project Approach for Solution Stabilization . The current path forward for the Solutions subproject is to stop the current installation work on the production vertical denitration calciner (VDC) and proceed with the design and installation of the magnesium hydroxide precipitation process. Since the installation of the VDC is near completion (approximately 80% complete), it should remain available for use should difficulties be encountered with the planned magnesium hydroxide process.

The VDC project work associated with the upgrades in the down load facility in Room 227 will be completed. The Room 227 work includes seismic upgrades to Glovebox HC-227S and electrical and piping modifications in Room 227. These upgrades will support the magnesium hydroxide precipitation process.

Design and fabrication of the magnesium hydroxide precipitation process equipment will be initiated in FY 1999. Current planning includes fabrication of the glove box, and installation of the equipment in the glove box by off-site fabricators. Following delivery of the equipment to Hanford, operator training and shakedown testing will be performed in a non-radioactive and non-safeguards facility prior to installing the equipment at PFP. Operator training is expected to begin during the second quarter of FY 2000.

Construction activities will begin in October 1999 with room preparations, and be completed by the end of the second quarter, FY 2000.

Previously, the baseline approach for solution stabilization involved a process of direct denitration through use of a vertical calciner. Impure solution material required treatment through an ion exchange system prior to introduction to the vertical calciner. The alternative processing approach of treatment by magnesium hydroxide precipitation was chosen over use of ion exchange and vertical denitration calciner due to its design and operating simplicity and its ability to treat all solutions without pretreatment.

Processing of the plutonium-bearing solutions is based on two shift operation. One shift will be used to download the solutions from their containers into the glove boxes in Room 227 for blending (and dilution if required). The second shift of operators will receive the solution from Room 227 and process the solution through the magnesium hydroxide precipitation process. The precipitated product material will then be dried on a hot plate and thermally stabilized in the 234-5Z Building muffle furnaces.

6.3.2.2 Approach for Residue Stabilization . In general, administrative preparations including processing calculations, environmental permits, safety reviews, and other documentation are performed prior to initiation of processing activities. These processing activities are then linked logic tied to provide the overall processing duration. All residue streams are currently scheduled for completion by the third quarter 2004 per the following discussions. Two separate processes will be implemented to stabilize residues: cementation, and "pipe and go."

Cementation:

- The administrative preparation and documentation effort is scheduled to begin the third quarter of 1999, with the Readiness Assessment scheduled for completion by the second quarter of 2000. The compounds will be processed in FY 2000, followed by miscellaneous residues. This is based on a one-shift per day, five days per week basis. At this point, cementation operations will be stopped (except for minimal operations to maintain proficiency). The SS&C is scheduled for processing beginning October 2001 and will be completed in the first quarter of 2003.
- Processing of MOX and oxides containing less than 30 percent by weight plutonium will be initiated following completion of SS&C processing. Cementation of MOX/Oxides is scheduled from the first quarter of 2003 to the second quarter 2004. This will be followed by combustibles (the last residue stream).

Pipe and Go:

- The preparation and documentation effort is scheduled to begin the third quarter 1999, with the Readiness Assessment (RA) scheduled for completion by the fourth quarter 2001. (Note: The RA could be completed by late FY 2000, but was delayed to level operator resources.) Operations will begin in FY 2002 and will be completed within the first quarter following initiation of repackaging. This duration is based on a one-shift per day, five days per week operation.

6.3.2.3 Project Approach for Polycube Stabilization . The PFP polycubes will be stabilized using pyrolysis equipment that has been designed and fabricated by LANL. The equipment consists of the pyrolysis furnace with a catalytic converter to treat the off-gas. Fabrication is expected to be complete near the end of CY 1999. The pyrolysis equipment will be installed in the Remote Mechanical "C" line of PFP. Removal of existing equipment in the Remote Mechanical "C" Line is expected to be completed near the end of CY 1999. Pyrolysis equipment installation is expected to be complete in mid FY 2000.

Stabilization of the PFP polycubes is currently scheduled to be performed during an XYZ process schedule (three-shift rotation, Monday through Friday). The pyrolysis process is currently expected to take 12 to 14 hours to complete the cycle, with seven cycles completed during the course of a five-day work week (utilizing two furnaces for an expected throughput of 14 total charges per week). Pyrolysis is not currently scheduled to start until January 2003, due to resource limitations. Processing time is expected to be less than one year.

However, it is noted that recent (4/99) laboratory analyses have indicated that the current condition of the PFP polycubes may impact the current processing plans.

6.3.2.4 Project Approach for Thermal Stabilization . In general, administrative preparations, including processing calculations, environmental permits, safety reviews, and other documentation are performed prior to initiation of processing activities. The processing activities for metal and alloys are constrained by the availability of the bagless transfer system before brushing and/or thermal stabilization of these two material streams can commence.

Stabilization of oxide/MOX in the 234-5Z Building muffle furnaces will continue on a three-shift basis (XYZ rotation), five days per week, until the magnesium hydroxide precipitation process is available in July 2000. During magnesium hydroxide precipitation processing, the furnace capacity is expected to be fully utilized to calcine the dried precipitate. The stabilization of oxides/MOX in the 234-5Z Building muffle furnaces will recommence following completion of the solution processing through the magnesium hydroxide precipitation process.

Brushing/stabilization of metals will start as soon as the bagless transfer system is available (currently planned for November 2000) and will continue for three-shift per day cycle (XYZ rotation), five days per week. Alloy stabilization in the 2636-ZB Building furnaces follows immediately after completion of work on the brushing/stabilization of metals.

6.3.3 Project Approach for Direct Shipments Offsite

Shipments to SRS for canyon processing include high assay SS&C items, aluminum-plutonium alloys, and plutonium tetra-fluoride. These items will be packaged in gloveboxes to meet receiver standards, then packaged into 9975 containers or Department of Transportation 6Ms, as applicable. Shipments to Oak Ridge National Laboratory include highly enriched uranium items and special isotopes (excess standards which will be returned following completion of processing).

6.3.4 Facility Transition Approach

The PFP transition baseline was developed using a functionally based work breakdown structure. The functions (or activities) are based on the location hierarchy for the PFP complex. Each building, room, component or structure is addressed in the WBS. The WBS takes each location (as applicable) through the following steps: clean out and transition of the rooms and the process equipment, building dismantlement to achieve the clean "slab-on-grade final condition, post-dismantlement stabilization, and safe and stable actions for underground structures or residual contamination. In addition to the physical activities, required project management and process support activities are also included in the WBS.

A decision-based schedule was developed using critical path methodology. Key constraints and logic ties were used to sequence the tasks within the transition technical baseline. Links were also established between the stabilization, disposition, and maintain safe and compliant functions where appropriate.

The critical path for the transition schedule begins with the clean out and stabilization of the active process areas within 234-5Z Building, upon completion of stabilization activities within 234-5Z Building. Prior to this action, transition planning activity optimization studies, end point development, and Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) documentation must be prepared. The planning activities will identify decision points that will be used to update and refine the baseline in terms of how and when the various work activities will be performed.

Transition of a number of the areas within 234-5Z Building and elsewhere within the PFP complex can be initiated once the transition planning actions are completed but prior to completion of all stabilization actions. Initial areas scheduled for transition includes: the inactive process areas; the second floor administrative areas; the second floor chemical makeup areas; and the standards laboratory. It is assumed that the functions performed in these areas will be moved to other areas within the PFP complex. By starting activities in these areas operational experience can be gained prior to transitioning some of the more complex areas. Because of the regulatory concerns over 241-Z-361 tank, it is also scheduled to begin early on.

The critical path continues through the transition of all process and administrative areas within 234-5Z Building. Plutonium hold-up requiring removal and processing is addressed at this time. Also during this time frame, transition of 236-Z and 242-Z Buildings is initiated. Following completion of the process and administrative areas, it is then possible to begin clean-out and transition of the duct levels followed by the exhaust filter room, the waste handling area and the plastic shop. A NEPA evaluation is prepared to determine the level of documentation needed to proceed with each step of the transition program. It is assumed that an EIS will be required prior to building dismantlement but not prior to clean-out and transition of the rooms and gloveboxes.

Once all stabilization activities are completed in the 2736 Building complex (i.e., all repackaging and hold-up stabilization is completed) and all materials have been disposition (shipped), then transition, dismantlement, and post-dismantlement site stabilization for the 2736-Z Vault Complex and associated administrative and support buildings can proceed. These actions will likely proceed in about the same time frame as the 234-5Z Building duct level clean out and transition.

The critical path then continues through the dismantlement and post-dismantlement stabilization of 234-5Z Building. Dismantlement of 236-Z and 242-Z Buildings will proceed in parallel with 234-5Z Building. During the same time frame as the dismantlement of these buildings, the transition of the utilities and yard structures will occur. Clean out and dismantlement of the above ground portions of the 241-Z and 243-Z Buildings will be the last of the transition activities. Also, during this time frame, any required safe and stable actions for underground structures and waste sites will be conducted.

In an effort to maintain reasonable staffing profiles and consistent funding profiles, those activities that were not on the critical path, or otherwise constrained, were moved within the schedule to achieve the desired profile.

6.4 Baseline Schedule Summary

The revised baseline project schedule is shown in Figure 6-2 at a summary level (Level 7). The changes reflected on this schedule that are different from the current/approved baseline schedule are as follows:

- Acceleration of SNM shipping to start in February 2000 and to be complete in FY 2008.
- Acceleration of DNFSB Recommendation 94-1 stabilization targets from July 2005 to be completed by October 2004.
- Acceleration of PFP dismantlement in parallel with deactivation to be completed in FY 2016.

Key decisions that affect or could potentially affect the revised project baseline are shown in Section 3.0 of this IPMP, along with the strategies to be executed to address the accompanying issues. Upon resolution of key decisions, changes to the schedule, funding profile, and path forward will be incorporated into the baseline via appropriate baseline change requests.

To enhance the clarity of the graphic, the revised baseline summary schedule presented as Figure 6-2 does not show the milestones associated with the project. The following is a list of the milestones for the PFP Project.

Baseline Milestones

WBS Element	WBS Title	Milestone Title	Due Date
1.04.05.01.13.01.01	Stabilize Plutonium Metals	Complete Stabilization of Metals	3/01
1.04.05.01.13.01.02	Stabilize Plutonium/Uranium and Other (Zr, Mb, Th, Al, etc) Alloys	Complete Stabilization of Alloys	5/01
1.04.05.01.13.01.04	Stabilize Pu-Oxides/MOX (2736-ZB)	Complete Stabilization of Oxides/MOX	10/04
1.04.05.01.13.02.01	Stabilize SS&C	Complete Stabilization of SS&C	11/03
1.04.05.01.13.02.02	Stabilize Ash	Complete Stabilization of Ash	12/02
1.04.05.01.13.02	Stabilize of Pu-Bearing Solid Residues with <30 wt% Pu	Complete Stabilization of Other Residues	5/04
1.04.05.01.13.03.06.07	Provide Solution Stabilization Process Equipment	Complete Installation of $Mg(OH)_2$ Precipitation Unit	8/99
1.04.05.01.13.03.07	Stabilize Pu-Bearing Solutions via MgOH Precipitation	Complete Stabilization of Pu-Bearing Solutions	12/01
1.04.05.01.13.04.01	Polycubes Stabilization	Complete Processing Polycubes	3/04
1.04.05.01.13.04.09.07	Provide Thermal Stabilization Process Equipment	Complete Installation of Pyrolysis System	6/01
1.04.05.01.14.01.02.07	Provide Packaging System	Complete Installation of the Bagless Transfer System	10/00
1.04.05.01.14.02.02	Disposition Product Materials	Transfer Aluminum Alloys to SRS	1/01
		Transfer SS&C to SRS	1/01
		Transport Fluoride Compounds	11/00
		Transport Isotope Sources (NMMS) to Oak Ridge	1/07
1.04.05.01.15	Transition Plutonium Finishing Plant	236-Z Clean Out Complete	3/12
		2736-ZB Clean Out Complete	3/14
		234-5Z Process Areas Cleaned Out	3/10
		234-5Z Transition Project Complete	4/16

		241-Z Transition Project Complete	4/16
		Dismantlement EIS Complete	9/08
		PFP Transition activities complete	9/16

6.5 Baseline Cost Summary

The cost summary for the project is presented in Figure 6-3, Figure 6-4, and Tables 6-1 through 6-5. The project life cycle cost for the revised baseline is estimated at $1.35 billion dollars, representing cost savings of $1.17 billion dollars. This savings is possible through the implementation of strategies presented in Section 3.0 of this IPMP and the reinvestment of the resulting efficiencies and savings, generated as a result of the implementation of the strategies, back into the project.

Figure 6-3 and Table 6-1 show the summary level budget at Level 5 of the functional breakdown. The funds profile for disposition material in FY 2000 includes $20M in line item funding for the W-460 Stabilization and Packaging Project, currently the Bagless Transfer Project. The funding profile for W-460 assumes a FY 1999 carryover amount of $5M. The overall fiscal year profile is fairly level over the first seven years of the project (excluding the W-460 budget) and is consistent with current funding projections for the Hanford Site. After FY 2006 a steady reduction in overall fiscal year budget requirements reflects the completion of stabilization and disposition functions, the reduction in overall Maintain Safe and Compliant Conditions requirements, offset by increasing progress on PFP transition activities. Table 6-4 and Table 6-5 contain budget information at WBS Levels 7 and Level 8 respectively.

The labor profiles are provided in Table 6-2, PFP Life-Cycle Summary Total Labor Profile and Table 6-3, PFP Life-Cycle Summary Labor by Type. Several labor types were considered as constraints for "leveling" schedule activities. Operators, Supervisors, and Health Physics Technicians require the most lead time from point of hire to productive work. Due to this considerable effort was made to ensure fairly flat resource usage for these labor types. In FY 2000 it is planned that 20 Operators and eight Health Physics Technicians will be hired in the Second Quarter to ensure production continues on schedule in FY 2001 and beyond. In FY 2006 Operator requirements peak above the level required in both FY 2005 and FY 2007. It is assumed that PFP operators will be supplemented with deactivation operators and/or waste management operators from other Hanford Site Contractors. These supplemental operators will be required in FY 2006 and some of the out-years to assist in the transition activities.

6.6 Management Reserve/Contingency

Historically, cost and schedule contingency has not been formally applied to expense-funded activities at the Hanford Site. However, cost and schedule contingency is used in capital funded activities based on guidance within DOE Order 430.

Subsequent to the submittal of the IPMP, DOE will provide the DNFSB with commitments to stabilize and disposition Plutonium-bearing materials in compliance with the DNFSB Recommendation 94-1. In addition, RL will negotiate commitments (Tri-Party Agreement Milestones) with EPA and Ecology for the stabilization and transition of the PFP Complex.

To provide DOE and the stakeholders with a high confidence schedule of activities that in many cases are first-of-a-kind, or use systems and/or equipment that are over 50 years old, an appropriate level of schedule and cost contingency has been applied.

6.6.1 Contingency Background Information

Contingency has been applied to all construction projects on prior submissions of the PFP baseline. No additional cost or schedule multipliers were applied to the non-construction related activities (i.e., surveillances, maintenance, process operations) with the exception of the calculated total operating efficiency (TOE) factor to account for managed process downtime. In prior submissions of the PFP baselines, a Total Operating Efficiency (TOE) Estimate of 56 percent was applied to process area activities. A direct comparison to the old baseline and old basis for the TOE is not practical. Different techniques were used to estimate TOE and to document the re-baseline schedule and its basis of estimate.

Planning assumptions and an assessment of estimate has been documented throughout the estimate. Decision points and up-front alternatives analysis/assessments have been scheduled for activities that had issues associated with planning assumptions. However, a project risk analysis, including activity dose analysis, activity duration uncertainty analysis, cost uncertainty analysis, and interface uncertainty analysis has not yet been completed for this project. Additionally, a number of the projects are new, or new for PFP. A formal risk assessment for the stabilization and disposition functions is planned for completion within FY 1999.

The baseline was built on currently approved requirements, procedures, and processes. Changing requirements will be a reality throughout the implementation of the baseline. Due to this and the potential for major impacts (both positive and negative) from the requirements change evolution, a requirements analysis was conducted and tied to each of the affected functions (WBS elements). If a requirement is challenged for waiver, an engineering analysis and budget analysis can be documented through the baseline change system. Each change will be evaluated to determine the impact of removal of the requirement on all effected functions/elements. Since the requirements are primarily approved through a rigorous process (e.g., S/RIDs, Safety Analysis Report, Tri-Party Agreement, NEPA, etc.) or are mandated by law, the re-baseline effort could not assume the success of a challenge process. Stating that such an effort will take place (i.e., requirements challenge) is provided to enhance the overall "confidence" in the life-cycle schedule since all documented efficiencies gained through this effort will be applied to the acceleration of workscope and/or "catch-back" schedules. Of course, all efficiencies and application of potential savings will be documented through the appropriate level of change control.

In addition, in previously completed Facility Stabilization Projects, significant benefits were gained through the application of the re-engineering initiatives (e.g., Plutonium-Uranium Extraction and B Plant). PFP faces many of the same types of work scope in the out-years (primarily the transition/deactivation work scope). However, key differences exist in the areas of product stabilization, safeguarding, packaging, and in the overall dismantlement approach for PFP. Benefits are anticipated at PFP through the application of re-engineering, however the potential impacts of this change to life-cycle budget and schedule have not been calculated for the existing or new baseline. During the initial stages of implementation (underway as of April 1999) an evaluation of potential savings will be calculated for the PFP life-cycle baseline. Procedures and work processes will then be evaluated and approved through the operations, engineering and safety analysis review/approval functions. Change control will be used to accelerate work scope or to establish management reserve accounts within the baseline if potential savings are realized through the approval of new procedures and processes.

6.6.2 Contingency Calculations

Contingency has been applied to various activities within the PFP Project. Different techniques have been applied to the activities based on the type of function or groupings of functions. The following categories were used for the application of contingency:

- Capital Projects
- Maintain Safe and Compliant Functions (1.04.05.01.10 and 1.04.05.01.11)
- Stabilization and Disposition Material Functions (1.04.05.01.13 and 1.04.05.01.14)
- Transition PFP Function (1.04.05.01.15)

6.6.2.1 Maintain Safe and Compliant Functions . No contingency was applied to functions or sub-functions within the 1.04.05.01.10, Maintain Safe and Complaint Materials and 1.04.05.01.11, Maintain Safe and Compliant PFP major functions. These activities are mature and are well understood and do not need contingency. The infrastructure projects contained within these functions are less well defined but these projects are at a pre-conceptual stage and the estimate is considered rough order of magnitude.

However, as the fiscal year and life cycle project progresses, it is anticipated that the political and regulatory environment will change. In addition, PFP is approximately 50 years old and may experience fluctuations within the corrective maintenance and special projects sub-functions. At the time of the preparation of this estimate, several infrastructure projects had been identified and rough-order-magnitude estimates were prepared. As these projects are better defined and potential new projects are identified and defined, PFP will require change control actions to accommodate these projects into the estimate and schedule.

Funding for these change control actions will be managed in the following way. First, PFP is currently going through a re-engineering process that will change the way work processes are conducted. The current estimate is based on existing practices and procedures. As modifications are made to these procedures/practices, it is envisioned that efficiencies will be gained. These efficiencies may be used to offset increases in infrastructure projects and/or accelerate other functions. Second, PFP has developed several processes to evaluate, and challenge requirements. Since these functions are primarily requirements driven, reductions in requirements should reduce resource demands. Again, these efficiencies may delay projects or accelerate work scope. Third, if efficiencies are found in other functions they will be applied in the same manner. Finally, the use of the Hanford Site Integrated Priority List will be updated with the new resource requirements for evaluation and funding priority.

6.6.2.2 Stabilization and Disposition Projects. PFP has historically utilized the guidance provided in the Project Management Hanford Contract procedures (e.g., *Cost Estimating* , HNF-PRO-585, Rev. 0) and associated DOE orders for estimation of capital project costs, including the application of contingency and determination of its magnitude. A primary factor in determination of the contingency is the level of completeness of the design, with those estimates for early conceptual designs reflecting higher risks of unknowns, and thus higher contingency. Development of equipment designs where the associated processes are still being defined adds significantly to the applied factor. Additionally, working conditions such as radiological or chemical hazards, security requirements, or other unusual situations that may impact the scope of the project or the ability to maintain daily schedules, are utilized in the contingency development. Each of these conditions is evaluated separately and in total by the cost estimators to establish the proposed contingency value, which can range from 10 percent to 30 percent. PFP, due to an abundance of the above conditions, typically applies a 25 percent rate.

Contingency utilized for the projected Stabilization "construction type" projects include the following:

- Bagless Transfer System (BTS) - 25 percent capital funded - The BTS (or W-460 Project) includes design and installation of a stabilization system, packaging equipment to apply an inner organic free can, and equipment to apply an outer can compliant with DOE-STD-3013. Additionally, it includes several vault and facility upgrades necessary to support the project. The project is currently in the conceptual stage of layout and design, with specific processing parameters, and specific canning designs still outstanding.
- Pyrolysis System (Installation of LANL provided equipment) - 30 percent expense funded - The pyrolysis system is being designed and built by LANL for PFP. The technology was recently developed by LANL and is subject to unknowns associated with application to the specific PFP materials. As a result, the high risk of this first-of-a-kind system carries a high contingency.
- Magnesium Hydroxide Precipitation - 26 percent expense funded - A decision to implement a magnesium hydroxide precipitation process at PFP was made in February of this year, and PFP personnel only recently visited RFETS to view their system. The RFETS system design will be modified to interface with existing PFP loadout, glovebox and conveyor systems. The recent startup of this effort and the need to integrate this system within existing glovebox and conveyor systems increased the need for project contingency.
- Muffle Furnace Upgrades - 10 percent expense funded - PFP currently has two operational muffle furnaces and three partially installed furnaces. The experience with installation of this type of equipment reduced the required contingency.

6.6.2.3 Stabilization and Disposition Materials Functions . The Stabilization and Disposition functions contain both cost and schedule contingency. The process to add the schedule and cost contingency to the baseline was accomplished through the application of a single multiplier to the impacted functions. This multiplier included both the TOE calculated value and a management judgment value for contingency/management reserve. The TOE for stabilization and disposition functions was calculated to be 61.1 percent for process area related activities. A basis document exists which provides the calculations and areas of impact that were used to calculate the TOE. (See HNF-4084, Rev. 0, PFP Total Operating Efficiency Calculation and Basis of Estimate).

The multiplier included the 61.1 percent value for TOE and a value of 5.1 percent for contingency/management reserve for an overall factor of 56 percent. These combined factors equal an effective multiplier of 1.786. or 1/(61.1-5.1 or 56 percent). This modified TOE multiplier (1.786) was placed within the schedule to allow for both schedule and budget contingency, primarily to increase the confidence in the overall life-cycle estimate and schedule.

The delta (5.1 percent) between 56 percent and the documented 61.1 percent, results in a contingency/management reserve value of approximately 9 percent (1.786-(1/.611 or 1.637)). While some of these activities are well known and fairly routine at PFP (e.g., thermal stabilization), others will be conducted for the first time at PFP (e.g., pyrolysis, magnesium hydroxide precipitation). For thermal stabilization associated with metals and alloys, only the TOE factor was applied. Upon completion of a formal risk analysis and/or realization of efficiencies as the result of re-engineering, the contingency/management reserve calculation may change.

For baseline control purposes, the budget delta between the TOE factor and contingency can be managed in a separate management reserve fund within the overall material stream. However, the baseline reflects the projected Total Estimated Cost (TEC) which includes project costs plus contingency/management reserve.

For cost and schedule contingency purposes, a modified TOE multiplier of 1.786 was used on the following types of functions:

- Transfer and Process - TOE applied to all activities within these critical functions but not all resource types (Material and Assessments excluded). Areas that impact TOE (as documented in HNF-4084) were not accounted for within the Activity-Based Cost Estimate, which only estimates operational activities or steps. Contingency has been added to these functions to account for process throughput variability, learning curve, and TOE areas impacted greater than planned.
- Repackage - Same as "Transfer and Process"
- Store - Same as "Transfer and Process"
- Disposition Stabilized Product - Same as "Transfer and Process"
- Disposition Fluoride Compounds - Same as "Transfer and Process"
- Disposition Aluminum Alloys - Same as "Transfer and Process"
- Disposition SS&C - Same as "Transfer and Process."

6.6.2.4 Transition PFP Function . No contingency has been applied to functions within the major function Transition PFP (1.04.05.01.15). Two major planning assumptions were used within this function, which have significant impact on the cost and schedule. First, the use of existing work processes were assumed. Like the Maintain Safe and Compliant functions, efficiencies should be gained through re-engineering. Second, the use of existing technologies was assumed. Small efficiencies gained in the use of new technologies for size reduction and cutting or waste handling would create significant reductions in forecasted resources. Decision points and technical studies have been placed within the estimate, to help ensure potential cost saving areas are identified in a timely manner.

6.7 Cost and Schedule Reduction Opportunities

Several opportunities have been identified which offer significant opportunity to reduce the schedule and cost of the re-baseline. While they were identified during the process of developing the re-baseline, they were not incorporated because they were preliminary and required additional work. Since the re-baseline was to represent a high confidence schedule, only those improvements that were well developed were incorporated. This document describes several opportunities and provides cost and schedule benefits where they were known.

6.6.2.4 Total Operating Efficiency (TOE)

The largest potential schedule and cost benefit comes from reducing the TOE. The re-baseline assumed a 61 percent TOE with a five percent contingency for a net effectiveness of 56 percent. On a five-year schedule (FY 2000-FY 2004), an improvement to an effective TOE of 70 percent reduces the schedule by about nine months. An improvement to 80 percent TOE improves the schedule by about 15 months. The schedule can be reduced a year and a half if the effective TOE is improved to 80 percent. TOE elements should be used as metrics and tracked during stabilization and packaging operations. As BWHC becomes confident, they can operate at the higher TOE, and the re-baseline schedule can be modified to reflect the improved TOE.

6.7.2 Magnesium Hydroxide Precipitation Improvements

Meetings will be held with the facility director on a frequent basis to ensure all necessary steps are being taken to accelerate the fabrication and installation schedule.

A number of improvements to the precipitation process have been proposed and are under investigation. First, the unloading rate used in the re-baseline for impure solutions is only four cans per shift. This is a severe limitation on the processing rates. It now appears that these unloading rates can be significantly improved if some modifications are made to the room to make unloading the bottles easier. Meetings are planned with knowledgeable operators and radiological control technicians for late April to obtain redesign to improve the unloading rates. The current baseline assumes that four cans per shift are downloaded for the impure solutions. The unloading rate of 1 can per shift used for pure nitrate solutions is based on load-in and dilution to support plutonium concentration requirements for processing.

Second, testing is now underway in the Plutonium Process Support Laboratories to determine if we can successfully operate the precipitation process at 45 grams per liter or more. If the laboratory tests prove that the process can operate at these concentrations, analysis will need to confirm there are no criticality or safeguards issues operating at these concentrations.

Operating at the higher concentrations will cut our processing time by as much as 100 days should criticality limits be changed to accommodate a higher plutonium capacity in the muffle furnaces.

Third, evaluating the possibility of using impure solutions to blend with the pure solutions to get them to 45 grams per liter can provide additional savings. This offers the potential to reduce the number of bottles of impure solutions that have to be handled singularly to about 100. This could save between 40-50 days on the schedule. The impact on disposition should also be evaluated since we will be introducing significant impurities in the form of iron and other metals from the impure solutions into what was going to be precipitate with a low level of impurities. If there will be significant impact to the disposition program, this impact will have to be weighed against the cost and schedule benefits to determine which course to take.

6.7.3 Metal Brushing

If it is determined that brushing does not have to take place in an inert glovebox, brushing could take place in 2736 –Z Building. This would avoid the movement back and forth between 234-5Z and the 2736-Z Buildings vaults. Though there is not likely a huge schedule benefit, it should be evaluate to minimize movements between buildings and unnecessary handling and packaging.

6.7.4 Polycubes

Recent test data indicates that the polycubes have undergone significant chemical change due to radiolysis. Less than 40 percent of the weight is being lost during the pyrolysis step rather than the expected 70 percent. The char formed by the pyrolysis step has a large amount of carbide in it. This material is not burned to carbon dioxide at high temperature. In fact, tests run on the char showed weight loss of less than one percent per hour at 1,000 degrees Centigrade. If additional testing confirms this, it would mean that we would have a material that does not meet the Materials Disposition criteria due to the large amount of carbon. In all likelihood, disposal to WIPP will probably be directed. A waiver may be required if the car is over 30 percent plutonium. The most likely scenario if disposal to WIPP is directed is to not pyrolyze the polycubes, but simply to break up the cubes and send blend them down with like material before packing into pipe components.

6.7.5 Residues

It might be possible to blend down some of the residues with other "like" materials and put into the pipe components without cementation. It would appear to offer significant potential for improvement in the <30 percent oxides and the other small residue streams. If you assume that you can package five material for pipe components a day, you can do the <30 percent oxide and the other small streams in about two months versus the current schedule of one year to cement.

--- The following Figures & Tables have not been transferred for inclusion of this example ---

Figure 6-1. PFP Work Breakdown Structure.

Figure 6-2. PFP Life Cycle Integrated Schedule.

Figure 6-3. PFP Annual Cost Summary.

Figure 6-4. PFP Cumulative Cost Summary.

Table 6-1. PFP Level 5 Life Cycle Summary Cost Profile.

Table 6-2. PFP Life Cycle Summary Total Labor Profile.

Table 6-3. PFP Life Cycle Summary Labor by Type.

Table 6-4. PFP Level 7 Life Summary Cost Profile.

Table 6-5. PFP Level 8 Life Cycle Summary Cost Profile.

11.0 SUPPLEMENT

The sections included in the IPMP as supplements will be available and controlled as separate documents to describe the key strategies and plans for accomplishing the PFP Stabilization and Deactivation Project. A brief description of the scope of each supplement and how each will be controlled is provided below.

11.1 BASELINE DOCUMENTATION

This section contains the most recent revision of documents that constitute the official PFP project baseline. The technical, schedule, and financial baseline planning documents that fully define the project baseline are referenced below. These documents are prepared, updated, and maintained in accordance with applicable PHMC procedures governing Project Control and Information Resource Management. Combined, these baseline planning documents establish scope, cost, and schedule for the PFP Stabilization and Deactivation Project, integrating the ongoing S&M activities with stabilization and transition activities.

- HNF-SP-1234, *Facility Stabilization Project Fiscal Year 1999 Multi-Year Work Plan (MYWP) for WBS 4.1*.

The MYWP is prepared based on all of the planning documents referenced below and serves as the vehicle for obtaining DOE approval of the planned work scope. The MYWP specifies all milestones and deliverables, establishes both short-term and long-term schedules, and provides summary details on the financial, human, and material resources needed to accomplish the project work scope according to the established P3 detailed, resource-loaded work schedules. The MYWP also summarizes the objectives, assumptions, and constraints related to accomplishing the baseline work scope, which are more fully detailed in the planning documents referenced below.

- HNF-3681, Revision 0, *PFP Transition Final Condition Definition*.

  The purpose of this document is to provide a clear definition of the final condition of the PFP Complex following completion of the PFP Stabilization and Deactivation Project. The final condition description provides a definitive definition that will be applied in detailed end point development for PFP transition and in subsequent detailed planning.

- HNF-3704, Revision 0, *PFP Materials Disposition Planning Guide*.

  This document provides guidance for the development of the planning basis case and alternatives for materials disposition at PFP. This guidance provides the planning team with summary information on the different material streams and identifies the major functions associated with materials disposition for each stream.

- HNF-3724, Revision 0, *PFP Requirements Development Planning Guide*.

  This planing guide presents the strategy and process used for the identification, allocation, and maintenance of requirements within the PFP integrated project baseline.

- HNF-3725, Revision 0, *PFP Issues/Assumptions Development and Management Planning Guide*.

  This planning guide presents the strategy and process used for the identification, allocation, and maintenance of an Issues and Assumptions Management List for the PFP integrated project baseline.

- HNF-3729, Revision 0, *PFP Functional Development Planning Guide*.

  This planning guide presents the strategy and process used for the identification, development, and analysis of functions (activities) necessary to satisfy the requirements within the PFP integrated project baseline. The functional analysis will provide the basis for the development of a function driven work breakdown structure.

- HNF-3771, Revision 0, *PFP Location Description Planning Guide*.

  This planning guide presents the strategy and process used for the identification and grouping of buildings, areas/systems, rooms/components, and equipment into a logical hierarchy for PFP. This breakdown of the physical system will support the functional analysis and requirements allocation by linking the necessary activities and driving requirements to the applicable room and/or equipment item. For each room or major system component a physical description will be provided, a description of the radiological, chemical, and industrial hazards will be given, and security or special working conditions will be specified.

- HNF-3772, Revision 0, *PFP Estimating Planning Guide*.

  This planning guide presents the strategy and process used for the verification, collection, and documentation of the resources necessary to satisfy the estimating requirements and function-driven work breakdown structure of the PFP integrated project baseline. The estimate will document the basis for the life cycle cost of stabilization through deactivation.

- HNF-3844, Revision 0, *PFP Interface Identification and Management Planning Guide*.

  The purpose of this planning guide is to present the process used to identify, document, and control PFP Stabilization and Deactivation Project interfaces.

- HNF-4084, Revision 0, *PFP Total Operating Efficiency Calculation and Basis of Estimate*.

  The purpose of this document is to provide guidelines for calculating the Total Operating Efficiency for the material stabilization operations to be conducted in 234-5Z. This information will be used to support both the planning and execution of the PFP Stabilization and Deactivation Project resource-loaded, integrated schedule.

- P3 detailed, resource-loaded schedules.
- Basis of Estimate planning forms.
- Waste Forecast.

Example 35

7.0 Baselines

7.01 Performance Baseline

The performance baseline consist of the work scope defined in Appendix C that is summarized in paragraph 4.03, *End Point Summary* .

4.03 End Points Summary

Once the objectives that will drive deactivation have been defined, a generic set of task types is developed. The DOE guidance (Reference #8) lists a generic set of task types based on what was used for the PUREX facility at the Hanford Site. This guidance also suggests that other facilities may have a different set. FDD has defined the following generic set of task types for 322-M:

- Reducing industrial safety hazards
- Reducing source term (radioactive and/or hazardous)
- Stabilizing or fixing contamination
- Isolating contaminated surfaces
- Ensuring structural integrity
- Documenting and labeling
- Providing access for S&M
- Removing equipment

The next step in the DOE guidance on setting end points is to define the cases or end use areas for the spaces, systems and equipment within a facility. The guidance suggested the following six cases:

- Internal spaces for which access is not expected
- Internal spaces where routine access for S&M will be required
- External spaces including building exterior envelopes
- Systems and equipment to be abandoned in-place
- Systems and equipment to be preserved for later use during decommissioning
- Systems and equipment which must be kept operational during S&M

Only the first four cases apply to 322-M. The fifth case, systems or equipment that would facilitate decommissioning, is not applicable for 322-M since none were identified. The sixth case also does not apply to 322-M since the anticipated long-term S&M plan will not require use any of the existing systems or equipment.

Functional matrices were then developed for each of the four cases defined for 322-M. These matrices are shown on the following pages. Each matrix relates the four objectives to the eight task types. The cells in the functional matrices specify the criteria that the end points are required to meet for that case. Cells marked *Primary* identify task types that are very important to perform in order to meet an objective. Work packages that accomplish end points that fall into a cell of the matrix marked *Primary* must be performed and will receive the highest priority for funding.

End points that fall into a cell marked *Secondary* are not critical to meeting an objective. However, work packages that accomplish those end points will reduce overall life cycle cost and should be considered for funding if additional money is allocated beyond that required to complete the work in cells marked *Primary*. Another advantage to planning the work packages to accomplish end points that meet the *Secondary* criteria is to have planned activities to use for work-arounds, when other FDD work is delayed, or if additional funding becomes unexpectedly available.

The shaded area cells signify that no objective is being met if work packages of that task type are performed for that case. Performing that type of work for that case is not necessary to accomplish the post-deactivation End State for the facility and these tasks would not normally be performed during the deactivation phase.

Case 1: Internal spaces for which access is not expected during S&M

OBJECTIVE	TASK TYPE							
	Reducing hazards	Reducing source term	Stabilizing or fixing contamination	Isolating contaminated surfaces	Ensuring structural integrity	Documenting and labeling	Providing access for S&M	Removing equipment
Protect public, worker and environment				Secondary		Secondary		
Facilitate S&M	Secondary	Secondary		Secondary		Secondary		
Facilitate decommissioning	*Primary*	Secondary				*Primary*		
Good stewardship								Secondary

Case 2: Internal spaces for which access will be required for S&M

OBJECTIVE	TASK TYPE							
	Reducing hazards	Reducing source term	Stabilizing or fixing contamination	Isolating contaminated surfaces	Ensuring structural integrity	Documenting and labeling	Providing access for S&M	Removing equipment
Protect public, worker and environment	*Primary*	*Primary*		*Primary*		*Primary*	*Primary*	
Facilitate S&M	*Primary*	*Primary*		*Primary*		*Primary*	*Primary*	
Facilitate decommissioning	*Primary*	*Secondary*				*Primary*		
Good stewardship	*Secondary*							*Secondary*

Case 3: External spaces for which inspection is required for S&M

OBJECTIVE	TASK TYPE							
	Reducing hazards	Reducing source term	Stabilizing or fixing contamination	Isolating contaminated surfaces	Ensuring structural integrity	Documenting and labeling	Providing access for S&M	Removing equipment
Protect public, worker and environment				*Secondary*		*Secondary*		
Facilitate S&M	*Secondary*	*Secondary*		*Secondary*		*Secondary*		
Facilitate decommissioning	*Primary*	*Secondary*				*Primary*		
Good stewardship								*Secondary*

Case 4: Systems and equipment to be abandoned in-place

OBJECTIVE	TASK TYPE							
	Reducing hazards	Reducing source term	Stabilizing or fixing contamination	Isolating contaminated surfaces	Ensuring structural integrity	Documenting and labeling	Providing access for S&M	Removing equipment
Protect public, worker and environment				*Secondary*		*Secondary*		
Facilitate S&M	*Secondary*	*Secondary*		*Secondary*		*Secondary*		
Facilitate decommissioning	*Primary*	*Secondary*				*Primary*		
Good stewardship								*Secondary*

After developing the functional matrices and establishing the end point criteria, FDD developed a set of generic end points by task type. These generic end points are listed below.

Task Type 1 Reducing industrial safety hazards

- Terminate all electrical connections at a location external to the building and to the support systems (e.g., at the 13.8 KVA substation, 352-4M)
- Remove and dispose of excess equipment that is a personnel hazard (e.g., a tripping hazard)

Task Type 2 Reducing source term (radioactive and hazardous)

- Remove contained radioactive sources
- Remove highly contaminated equipment
- Decontaminate surfaces

Task Type 3 Isolating internal surfaces

- Verify, and re-seal if necessary, all openings in glove boxes and hoods
- Verify, and reseal if necessary, all hot cell openings
- Verify, and reseal if necessary, all openings into the building including connections tot he process sewer, sanitary sewer, and the process waste lines
- Verify that the locks on all doors leading into RBAs are operable
- Blank off all utilities at the building external surface
- Verify seals on ducts, blowers, and HEPA filter housings
- Verify the integrity between duct sections and duct to equipment joints

Task Type 4 Stabilizing or fixing contamination

- Verify integrity of coatings on contaminated external surfaces
- Verify integrity of coatings on contaminated internal surfaces

Task Type 5 Ensuring structural integrity of building and external equipment and systems

- Inspect roof system and estimate remaining life of roof
- Verify structural integrity of building walls and coverings
- Verify structural integrity of external duct and exhaust systems

Task Type 6 Documenting and labeling

- Videotape and/or photograph building surfaces after deactivation

- Provide an updated radiation survey after removal of material and equipment
- Provide an updated contamination survey after removal of material and equipment

Task Type 7 Providing access for S&M

- Remove or block open all doors except those leading into RBAs
- Remove all ceiling tiles and insulation to gain visual access to roof
- Remove any equipment that blocks access to areas where visibility is needed

Task Type 8 Removing Equipment

- Removal and disposal of non-contaminated equipment or property
- Removal and disposal of contaminated equipment

7.02 Cost

7.02.01 Identification of Costs Associated with Current Facility Activities

Based on the activities identified in Chapter 5.0, *Surveillance and Maintenance* , the current annual S&M costs for 322-M are approximately $10,000. The current annual energy costs are $2,500 even though 322-M is unoccupied and all facility systems (e.g. HVAC) have been shutdown. The overwhelming portion of the energy cost is electrical power for the operation of the M-Area Lift Station adjacent to the North end of the facility. The lift station is currently fed off the 322-M motor control center and must continue to operate in support of sanitary facilities in 730-M and 704-M. The deactivation project will relocate the electrical feed for the lift station.

7.02.02 Identification of Cost Associated with Deactivation Activities

The endpoints identified in Appendix C, *Deactivation End Points* , have been regrouped as shown below into either categories of work that are similar in nature or are tied back to similar deactivation objectives. In addition, the work categories are prioritized according to the recommended order in which the work should be funded if sufficient funding is not available to in any one fiscal year to perform the activities required to attain the end points. However, the order of the groupings is not according to how the work would be performed in the field. For example, Grouping #4, Electrical Modification Work, would be the last activity to be performed after all other work to be done in the facility has been completed.

The estimated cost of attaining each group of end points is shown adjacent to the end point grouping, below. The total cost estimate for deactivating 322-M to achieve all the end points identified in Appendix C is $404, 500. ***All estimated costs are exclusive of site overheads***.

1. **Disconnect Utilities: $26,800**

322M-EP-15	Process drain line plugged or capped at manhole 6A
322M-EP-16	Domestic water line capped below grade external to building
322M-EP-17	Process water line capped below grade external to building
322M-EP-18	Two steam lines isolated external to building
322M-EP-19	Fire main capped below grade external to building

2. **Seal Openings: $71,800**

322M-EP-26	Openings through walls closed off after removal of AC units
322M-EP-03	Hot cell openings adequately sealed
322M-EP-04	Openings into 22 contaminated fume hoods adequately sealed
322M-EP-05	Openings into 2 glove boxes adequately sealed
322M-EP-06	All existing openings into building adequately sealed
322M-EP-07	All ventilation stacks penetrating roof adequately sealed and roof intact
322M-EP-08	All exhaust ventilation stacks adequately sealed
322M-EP-10	External ducts structurally intact and adequately sealed

3. **Fixing Contamination: $28,400**

322M-EP-09	External areas with fixed contamination adequately sealed (includes removal of degraded equipment)

4. **Electrical Modification Work: $59,600**

322M-EP-13	Electrical service disconnected at 13.8 KVA transformer
322M-EP-14	Electrical service to sanitary lift station relocated out of 322-M

5. **Post-Deactivation Work: $57,900**

322M-EP-27	Post-deactivation contamination labeled & mapped
322M-EP-28	RBA conditions videotaped
322M-EP-29	Long-term S&M Plan approved
322M-EP-30	Deactivation Project Completion Report issued

6. **Ceiling & Electrical Removal: $110,600**

322M-EP-01	Suspended ceiling tiles removed from all rooms and disposed
322M-EP-02	Insulation above suspended ceilings removed and disposed
322M-EP-21	All tritium containing exit signs removed and disposed
322M-EP-22	All fluorescent light tubes removed and disposed
322M-EP-23	All mercury vapor lamps removed and disposed
322M-EP-24	All fluorescent light ballasts removed and disposed
322M-EP-25	Wall mounted AC units removed and disposed

7. **Good Stewardship Work: $49,400**

322M-EP-11	Carpet tiles removed from Rooms 02, 03, 04, 05, 06, 07, 11, 100, 122 & 120
322M-EP-12	Doors removed or blocked open leading into all rooms except at RBA boundaries
322M-EP-20	All useable, non-contaminated office/lab furniture removed & excessed or salvaged

7.02.03 Work Breakdown Structure (WBS)

The deactivation tasks will be managed utilizing the site and division work authorization and cost collection systems. The standard site WBS will be applied.

7.03 Schedule

The work scope of this deactivation plan will be carried out as work requests under the site work management system as funding is allocated. Once work starts, it is estimated that it can be completed within twelve months. Upon approval of the Deactivation Project Plan, a Level III schedule will be developed based on the work activities and work restraints delineated in section 6.02, *Work Specification and Planning* .

6.02 Work Specification and Planning

Work specification and planning will be accomplished using the existing site work management system delineated in the WSRC Manual 1Y, *Conduct of Maintenance*. The work to be performed will be based on the endpoints identified in Appendix C, 322-M *Deactivation Endpoints*. Similar work activities will be grouped into one work package to improve efficiency and to streamline implementation of the deactivation plan. The following is a summary of the field work to be performed:

- Removal of selected contaminated and non-contaminated equipment
- Removal of ceiling tiles, insulation and light fixtures
- Removal of fluorescent light tubes, ballasts, and mercury vapor and sodium lamps
- Removal of trash
- Sealing of openings in building exterior walls and roof
- Robust sealing of opened process ventilation ducts
- Fixing/sealing of exterior contaminated surfaces
- Disconnection and/or isolation of facility fluid systems (incoming and outgoing)
- Disconnection of electrical power after repowering of M-Area lift station
- Building/equipment changes to facilitate future S&M activities

The following work sequence restraints will be applied to the performance of the 322-M deactivation activities:

- Deactivation/isolation of electric power is to be the last activity after all other deactivation is completed.
- Closing and sealing exterior penetrations, including locking doors, should be done in a way that allows two means of egress until occupancy associated with interior work is ended.
- Removal of fire extinguishers should be performed after other interior work is completed provided they have current authorization for use.
- Isolation of incoming fluid systems (steam, domestic water, etc.) should be done before corresponding drains are plugged.
- OSHA deficiencies or hazardous conditions (slippery floors, for example) should be corrected before work in the area starts.

7.04 Performance Measures and Progress Metrics

Standard monthly inputs to the WSRC Project Management Control System (PMCS) will be provided. PMCS automatically transmits data electronically to the DOE-SR Savannah River Management Reporting System (SRMRS). Monthly updates of cost and schedule status, compared with the project's current year Annual Operating Plan input submitted at the beginning of the Fiscal Year to DOE-SR, will be tracked.

7.04 Project Logic Diagram

Upon approval of the Deactivation Project Plan, a project logic diagram will be developed based on the work activities and work restraints delineated in section 6.02, *Work Specification and Planning* .

7.05 Configuration Management Plan

Configuration Management activities for this project will be carried out using a graded approach, consistent with the guidance in Reference #20. The CM Actions listed in Appendix B of Reference #20 will be carried out as follows:

<u>Action 1 - Develop System Boundaries</u>
This action will not be performed because the intended End State of 322-M is that all systems will be deactivated and all utility services that were connected to the systems in the facility will be disconnected by isolation at the facility boundary. This isolation will be reflected in Action 2.

<u>Action 2 - Develop and Update Drawings</u>
Revisions will be made only to those essential drawings that show the modifications made to the facility as part of executing the deactivation work scope. This could include drawings for utility services showing the isolation points, drawings of the ventilation systems showing where ductwork is blanked, and perhaps arrangement drawings to indicate where access and egress points are permanently closed. The drawing list for the 322-M Deactivation Project is provided in Section 2.01.

<u>Action 3 - Install Permanent Component Labels</u>
It is not cost-effective or necessary to label components that have been declared excess and that are permanently deactivated. However, a limited amount of labeling will be performed to indicate the presence of hazards that are not immediately visible. Examples would be "This wall contains lead shielding", labeling of material containing asbestos, and "Internal contamination". This could also include labels that indicate absence of such hazards, like "This transformer has been sampled and does not contain PCBs".

<u>Action 4 - CM Overview Training</u>
Action 4 is a programmatic initiative. It is implemented on the division level and therefore is not within the scope of this deactivation project.

<u>Action 5 - Integrate New CLI Numbers into Procedures</u>
Action 5 is a programmatic initiative. It is implemented on the division level and therefore is not within the scope of this deactivation project.

<u>Action 6 - Provide Item to Document Cross-Reference</u>
Actions 6 is a programmatic initiative. It is implemented on the division level and therefore is not within the scope of this deactivation project.